5 Maritime Cargo

AQIM Handbook

Contents

Background

The cargo population, or sampling universe, for AQI monitoring is now defined as specific categories. Random samples can be taken from these populations with more intensive (hypergeometric) inspections completed and necessary data recorded about these commodities

In order to properly monitor cargo, you need to have a good understanding of two key statistical principles:

1. It is important that the sample selected be representative of the category. Random selection helps ensure this.
2. Once the sample is selected, it is necessary to inspect the sample thoroughly and according to hypergeometric sampling procedures if applicable.

If you want your port to produce quality risk information, then each person participating must have a clear understanding of the sampling universe, the unit of sampling, and consistency issues.

The Sampling Universe

You estimate the number of actions due to pests or smuggling in a cargo entry pathway by taking random samples from the cargo in the pathway. It is key to good statistics to carefully define this universe

from which you want to draw your random sample. The following questions need answers in order select the sample correctly and to make statistical inferences for the entire universe.

- How are commodities transported?
- How many shipments of these commodities are arriving at a work location?
- What is the seasonality of the commodity?

For AQIM, the universe is defined by the mode of transport of the cargo such as airplane, ship, or truck. Initially, PPQ has decided to limit the universe. The following commodities or commodity types are **excluded** from the sampling universe:

- Commodities which are pre-cleared at foreign sites
- Frozen commodities;
- Commodities which undergo some type of mandatory treatment, other than cold treatment (for example, fumigation, irradiation, hot water treatment) at work locations
- Oil, salt, iron ore, coal, etc., which have no pest risk.

Cargo Strata and Stratifying the Sample

The sampling and inspection processes for AQIM were designed to be compatible with PPQ cargo inspection groupings. The cargo universe is divided into several homogeneous and distinctly separate groups. Each group contains commodities that will be sampled in order to estimate the action and pest approach rates in each group. A port may be sampling one or more of the commodities in a group or across groups. The following cargo categories are to be monitored in FY 2004:

Commercial Perishable Agricultural Cargo (This category is defined as any commercial shipment of fresh fruit or vegetables)	Sampling to take place at the ports of Brooklyn NY, Elizabeth NJ, Ft. Lauderdale FL, Long Beach CA, Miami FL, Wilmington DE, Philadelphia PA, Huston, TX
WPM (Wood Packing Material)	Sampling to take place at All Ports that receive WPM in cargo shipments
Italian Tile Container Cargo	Sampling to specifically take place at the ports of Baltimore MD, Charleston SC, Chicago IL (maritime rail), Elizabeth NJ, Houston TX, Norfolk VA, Miami FL, and Savannah GA.

By selecting a set number from these categories, PPQ is able to get precise estimates of the number of containers with pests approaching or other needed actions. This risk information helps the work location understand how effectively it manages the pest risk for each commodity, as well as for the entire cargo universe at the port.

It's very important that each commodity in a category selected be representative of all other units of that commodity. All shipments of a category should have a chance of being selected as a sample. One way to ensure that the sample is representative is to choose a shipment of the commodity at random (either random time, or random number, etc.). This random selection process eliminates the bias of the officer who is selecting the sample. The officer's experience (bias) might lead to choosing a shipment that is more likely to be harboring a pest. This bias would make the sample not representative of the entire commodity universe. The survey results would be skewed and this kind of bias would hamper the port's ability to make the best decisions based on risk analysis.

Setting Up a Process

Setting up a process of selecting representative samples for each of the commodities will be one of the biggest challenges in AQIM. Because each port has its own unique set of circumstances in cargo operations, the port must individualize its random sampling process. It will be necessary to document the process and possibly ask for feedback from other maritime cargo ports, regional AQIM coordinators or Port Operations staff who have experience in selecting random samples in the cargo environment. The port may even decide that the Port Risk Management Team determine and review the random sampling process on a regular basis.

The Unit Of Sampling

For maritime cargo, the sample unit is the container or container equivalent of the commodity. A container equivalent is defined as the number of pallets of a commodity (20) that would fill a 40 foot container. It is crucial that the sample unit is inspected closely enough to detect any actionable pests and any smuggling of prohibited agriculture commodities. Summary inspection procedures for maritime cargo begin on page 5-6. The procedures must be followed exactly in order for the monitoring estimates to be valid and useful.

Consistency of Data Collection

It is crucial that the monitoring results from the inspection of a random sample unit are recorded accurately and consistently. Because each sample represents many other units, all officers must be as consistent as possible in following the inspection procedures.

Regulated commodities pose a special challenge. If the sample selected is a regulated commodity, it is important to understand the following:

Cargo monitoring estimates the number of containers approaching the work location with commodity pest infestation levels requiring action by PPQ. AQIM uses risk-based inspection procedures for detecting a 10 percent or more pest infestation rate. This initial threshold is used to estimate the number of containers approaching a work location with a pest threat.

This 10 percent infestation level may change as the data for AQIM is collected and analyzed

To be 95 percent sure that the officer inspecting the sampled container will find the pest, when the shipment is infested at a 10 percent infestation or more level, the officer must select, at random, a specific number of boxes in the shipment. Determine this number of boxes by using the hypergeometric table illustrated in **Table 5-1**. Each of these boxes must be inspected at level of intensity to ensure that:

- No hitchhiker pests are present in the box,
- No internal feeding insects are present in randomly selected fruit in the box
- No mismanifested or smuggled items are present

TABLE 5-1: Hypergeometric Table For Random Sampling In Commodity Inspection

Total Number of Boxes Inside Sample Container	Number of Boxes to Select at Random From the Container and to Inspect to Detect Pests
1-10	10
11-12	11
13	12
14-15	13
16-17	14
18-19	15
20-22	16
23-25	17
26-28	18
29-32	19
33-38	20
39-44	21
45-53	22
54-65	23
66-82	24
83-108	25
109-157	26
158-271	27
272-885	28
886-200,000	29

Officers should follow normal inspection procedures of the commodities to determine pests. For example, officers should cut fruit to detect internal feeders if external evidence is present

Maritime Cargo Procedures Summary

MARITIME CARGO AQIM PROCEDURES	
Commodity	Random Sample of one or more of the following categories (non-frozen cargo & excluding pre-cleared cargo)(Cargo categories are to be monitored in FY 2004) : **Commercial Perishable Agricultural Cargo** (This category is defined as any commercial shipment of fresh fruit or vegetables.) (Sampling to take place at the ports of Brooklyn NY, Elizabeth NJ, Ft. Lauderdale FL, Long Beach CA, Miami FL, Wilmington DE, Philadelphia PA, and Houston TX) **WPM (Wood Packing Material)** (Sampling to take place at All Ports that receive WPM in cargo shipments) **Italian Tile Container Cargo** (Sampling to specifically take place at the ports of Baltimore MD, Charleston SC, Chicago IL (maritime rail), Elizabeth NJ, Houston TX, Norfolk VA, Miami FL, and Savannah GA)
Cargo Population Definition	All containers (or container equivalents) carrying the above commodities destined to US. This does not include precleared and frozen commodities. Also it does not include commodities with mandatory treatments at port of entry. Note: Commodities with mandatory cold treatments are included.
Sample Size	For **Commercial Perishable Agricultural Cargo,** select two (2) containers (or container equivalent) per week per port. (Excludes cut flowers. pre-cleared, and mandatory treatment cargo) For **WPM (Wood Packing Material,** select two (2) containers per week per port as All Ports that receive WPM in cargo shipments. For **Italian Tile Container Cargo,** select two (2) containers per week per port required (and as tile is seasonality available) **Contact Regional AQIM Representatives for assistance**[1]
Sample Selection	Port discretion, random time, skip intervals, etc. May need to first determine the total number of shipments of a commodity received at a port in one year. If commodity is seasonal, then sampling should be planned to occur during the full import season of commodity, if reasonable for the number of samples needed.

MARITIME CARGO AQIM PROCEDURES	
Inspection Methology	Each selected shipment requires a physical inspection at port or consignee premise. Boxes for inspection must be taken from random locations throughout the container to detect a 10 percent level of infestation (at 95% confidence). The number of boxes shall be set using **Table 5-1**. Entire contents of boxes selected and available floor space of the container shall be inspected for agricultural pests or mismanifested or smuggled items. For **Commercial Pershable Agricultural Cargo**: 1. Inspect cargo usiing appropriate AQIM hypergeometric inspection prodecures for each sample. 2. Record all needed data on appropiate FY 2004 AQIM data worksheet For **WPM (Wood Packing Material)** and **Italian Tile Container Cargo**: 1. Inspection of cargo and WPM is to assure observation of as much WPM as cargo will allow. Partial oor full de-vanning may be necessary based on situation and judgement of inspector. 2. Record all needed data on appropriate FY 2006 AQIM data worksheet
Other Issues	Inspections shall be conducted during the normal business hours at the port. Costs for OT clearance will be paid by the shipper/broker/consignee. Need to advise shippers, importers, and brokers that random sampling and inspection will be part of day-to-day operations. They should understand that there is a probability that their shipment will be intensely inspected.

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Pathway Monitoring Maintenance and Quality Assurance

Port managers and local AQIM coordinators are responsible for ensuring that monitoring activities are being performed and performed properly. To help with reviewing the status of monitoring activities, refer to **Appendix L**, Pathway Monitoring Maintenance, in the AQIM Handbook. This appendix contains a checklist of questions port managers and local AQIM coordinators should periodically answer to ensure proper monitoring of each designated pathway at their work locations. **See Figure E-1**. The questions review the following topics:

- Random sampling
- Proportional sampling
- Adequate sampling

- Accurate and complete data
- Working risk committees
- Local support

Maritime Cargo Worksheet

There is one worksheet for recording information gathered from your inspection of Maritime cargo for the purpose of AQIM. Be sure to record the commodity being inspected properly.

http://www.aphis.usda.gov/ppq/manuals/port/pdf_files/AQIM_in_PDF/Maritime_Cargo.pdf

Data Collection and Maintenance

Traditionally, PPQ based our work on how much cargo we inspected and on the number of pest interceptions found on cargo. We inspected cargo, found pests, and tallied them to justify good job performance. AQIM emphasizes work efforts based on the potential threat posed by foreign pests and quarantine material.

By sampling a set number of samples from each cargo stratum, PPQ is able to get precise estimates of the number of cargo containers with pests approaching. It is then easier to make comparisons which help the port understand how effectively it manages the pest risk in each cargo grouping, and therefore, for the cargo universe.

Every PPQ port needs to be involved in AQIM. Each port has a group of managers, supervisors, and officers who manage results monitoring and the subsequent risk management functions at the port. All PPQ personnel are involved and supportive of the process.

The expected results are that PPQ will have results monitoring systems in place that will meet the needs of management and the requirements of the GPRA.

Agriculture Quarantine Activity Systems (AQAS) User Guide for Data Entry

General Instructions

The data collected must be entered into the AQAS database. This is a web-based program and is accessible from any USDA APHIS or DHS CBP computer. The web address is:

https://mokcs14.aphis.usda.gov/aqas/login.jsp

A user name and password is required to enter and access the data. These can be obtained by contacting your immediate supervisor.

Survey Results and How To Use Them

AQIM Activities have been put into place to develop baseline data to help answer two basic questions:

1. What is the threat of agricultural pests approaching ports? What is the level of infestation of the pests in the cargo?
2. How effective is the AQI program at managing this threat?

Preliminary results for maritime cargo surveys provide a general answer for question 1. That is, there are varying rates at which prohibited agricultural materials or cargo units infested with an agricultural pest approach the ports. Surveys show that at some ports about 1.5 percent of the container units carried actionable pests in the past year, while other work locations show rates as high as 20 percent.

These percentages are an approximation of agricultural pest threat. Further analysis of the monitoring data is needed to determine the risk associated with maritime cargo approaching the work station. The origin and destination of the cargo are important to determine risk levels. Also, whether or not the cargo carries an actual agricultural pest or smuggled item is crucial in analyzing risk.

Analyses of the monitoring data need to occur at several levels of PPQ. At the ports, PPQ personnel need to study what the data means and answer the first question for their specific location. Analysis tools are available to help with these analyses, which are explained in the next subsection. At the same time, PPQ holds risk analysis workshops around the country to introduce risk analysis concepts. At some ports, teams of PPQ officers and managers form Risk Management Teams to look at monitoring data and other data, which are normally collected at the location.

At other locations, analyses of monitoring data occur to establish rates at which quarantined items and agricultural pests are approaching the borders of States, areas of the country, and the United States.

Once baseline rates are well established, PPQ can use the monitoring data as a baseline to answer the second basic question: How effective is the AQI program at managing the risk of introduction of agricultural pests and diseases? Again, each work location must conduct this type of analysis. AQIM provides a framework which work locations can use to carry out the analysis.

Questions to Guide Data Analysis

1. How many containers were selected for sampling during the survey period?

   How many actions were required on containers sampled?

   How many actions by strata category sampled were there?

   What is the action approach rate of containers that require action (number of containers requiring action divided by total containers in the sample)? What are the action approach rates by strata category?

2. How many pest interceptions (actionable pests) were made from survey samples?

   Pest approach rate: What is the rate of pest interceptions in relation to the total sampled number of containers (number of containers with actionable pests divided by number of containers total in the sample)?

3. Compare the rate of actions required for each month of the survey.

   DISCUSSION:

   Are these easily identified trends when the rate of QMIs transiting the port are higher?

   Are there seasonal trends?

   Do higher rates correlate with national or religious holidays, certain types of containers, cargo, or importers?

4. Generate a listing and frequency of shipments requiring action. Which commodities present the greater risk?

   Which commodities most likely require action? Where were the agricultural pests found? Which commodities involved solid wood packing (SWP) actions? What is the rate of containers with smuggled or mismanifested items?

   DISCUSSION:

   How effective is the current tailgate inspection process in detecting pests and/or smuggled cargo?

5. What types of shipments (refrigerated, mixed vegetables, dry containers, empties, cut flowers, express carriers, etc.) require higher rates of action?

   DISCUSSION:

   What selectivity factors are currently used to identify shipments likely to require action?

   What additional selectivity factors would be used to identify shipments likely to require action?

   Do the survey results indicate additional factors that help identify shipments most likely to require action?

6. Using monitoring data, apply the survey results to the cargo universe at the port to estimate the number of actions required and interceptions likely to transit the port during the same time the survey period took place.

   How many containers arrived at the port during the survey period? Using the action approach rate for containers requiring action, calculate an estimate of the number of containers transiting the port that are likely to require action. What are the estimates per strata category?

   Using WADS data, how does the estimated number of actions required compare with the reported number of actions taken?

   How many additional actions may have been required during the survey period?

   How does the estimated number of actionable pest interceptions compare with the reported number of actionable pests on WADS?

   DISCUSSION:

   What percentage of resources are dedicated to staffing AQI activities for maritime cargo at this port?

   What is the relative risk of maritime cargo compared with other pathways in the port?

   Should resources be reallocated among all the pathways in the port to better address the relative risk of the pathways?